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THE RATIONAL THRESHOLD VALUE (RTV) TECHNIQUE FOR THE EVALUATION--ETC(U)
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June 1978

Development of Environmental Information System

THE RATIONAL THRESHOLD VALUE (RTV) TECHNIQUE FOR THE EVALUATION OF REGIONAL ECONOMIC IMPACTS

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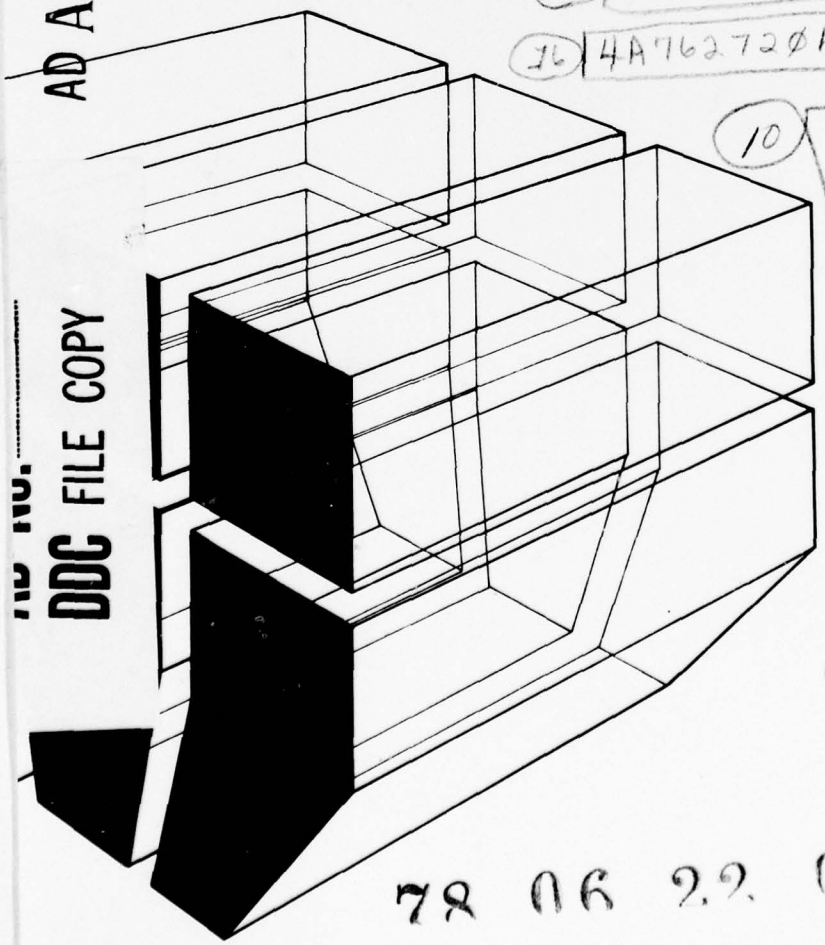

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This report presents the results of a study undertaken to develop a practical technique for evaluating the "significance" of predicted socioeconomic impacts. A review of important socioeconomic elements was undertaken, a list of indicator parameters was developed, and a technique for evaluating temporal change for establishing "significance" of the elements was developed. The result was the rational threshold value

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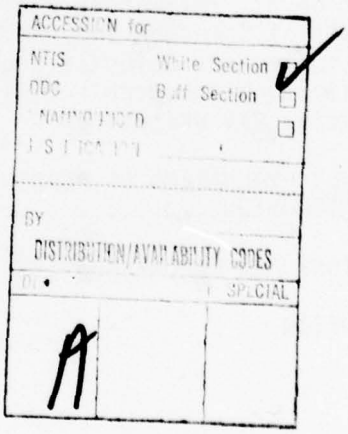
(RTV) technique, which can easily be used by DA planners and decision-makers involved in producing Environmental Impact Statements (EISs) and Environmental Impact Assessments (EIAs). Several hypothetical case studies were investigated to ascertain the practicality and usefulness of the technique. Results of these studies indicate that the RTV technique can be used as a screening device to establish the significance of economic and related social impacts resulting from Army military activities.

FOREWORD

This project was performed for the Directorate of Military Construction, Office of the Chief of Engineers (OCE), under Project 4A762720A896, "Environmental Quality for Construction and Operation of Military Facilities," Task 01, "Environmental Quality Management for Military Facilities," Work Unit 002, "Development of Environmental Technical Information System." Mr. V. Gottschalk, DAEN-MCE-D, was the OCE Technical Monitor.

This research was made possible through the efforts of DOD personnel, consultants from Battelle Columbus Laboratories and the University of Illinois, and scientists and engineers of the U.S. Army Construction Engineering Research Laboratory (CERL).

Administrative support and counsel were provided by Dr. R. K. Jain, Chief of the CERL Environmental Division. COL J. E. Hays is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.



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THE RATIONAL THRESHOLD VALUE (RTV) TECHNIQUE FOR THE EVALUATION OF REGIONAL ECONOMIC IMPACTS

1 INTRODUCTION

Background

The passage of the National Environmental Policy Act (NEPA),[1] generated a renewed interest in the modeling of environmental phenomena. Many experts believed that models would solve the complex problems of environmental analyses. However, these models have frequently fallen short of their proponents' optimistic expectations. Often, this failure can be related to the final interpretation of the model output. One of the requirements of environmental impact analysis is determining the significance of impacts. Model output alone cannot address this requirement; some criterion or "yardstick" is first necessary.

CERL researchers involved in the development of the Economic Impact Forecast System (EIFS)* identified this problem in the economics area. Estimated changes in business volume, income, employment, etc., were provided by the EIFS model, but no analysis tool for evaluating model output was provided. This weakness especially created problems in the economics area, where changes in business volume are often presented in millions of dollars. To the user, these figures seem quite significant; however, to the economist, their relationship to the local economy in aggregate would be used to evaluate model output. The problem was perplexing and the model development, following a traditional scientific path, had failed to address this aspect of user need. Therefore, it was necessary to develop a systematic approach for determining a rational threshold value (RTV) for economic and related social impacts.

Objective

The objective of this study was to develop an RTV technique or a criterion for determining "significance" of impact for economic and related social impacts resulting from Army military activities.

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[1] National Environmental Policy Act of 1969, 83 Stat. 852, 42 USC 4321 et seq. (January 1970).

* A computerized system which calculates the economic impacts on a specific region of a new military project or action.

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Approach

The requirements for adequate socioeconomic analysis were reviewed, based on historical precedents and on the knowledge of civilian and DOD scientists familiar with NEPA, economic impact analysis, and subsequent court interpretations. Groups of socioeconomic elements were then condensed into a smaller number of "indicator" variables, based on scientific prediction capabilities and the availability of sufficient data. A method for conducting temporal analysis of the indicator variables was developed, and a study of the effects of this technique on hypothetical DOD actions was undertaken. This report summarizes the results of this development and analysis.

Mode of Technology Transfer

The RTV technique has been incorporated into EIFS and DA Pam 200-2, *Economic Impact Forecast System--Description and User Instructions*, will be revised accordingly.

2 IDENTIFICATION OF THE NECESSARY ELEMENTS

Consultation with practicing regional economists, environmental analysts, environmental lawyers, and DOD personnel produced the following list of socioeconomic elements:

1. Change in business volume
2. Change in personal income
3. Change in employment
4. Impact on local government revenues and expenditures
5. Changes in income and employment distribution
6. Impact on local housing
7. Impact on regional economic stability
8. Impact on local school systems
9. Impact on local government bond obligations
10. Change in population
11. Change in welfare and dependence
12. Change in social control
13. Aesthetic consideration.

This list of elements indicates those considerations which have been controversial with respect to DOD problems[2,3] in the socioeconomic area. Many are broadly defined and nebulous, while others are easily defined and relatively easy to address. Subsequent sections of this report define these individual elements, clarify their importance, explain their military relevance, and otherwise indicate their meanings.

---

[2] "Breckinridge et al., vs Schlesinger," U.S. District Court, Eastern District of Kentucky, No. 75-100 (October 31, 1975).

[3] "McDowell vs Schlesinger," U.S. District Court, Western District of Missouri, Western Division, No. 75-CV-234-W-4 (June 19, 1975).

Change in Business Volume

Business volume is an indication of a region's local aggregate economic activity. As used in EIFS,[4] it is the total dollar flow of the four major sectors of a local economy: the wholesale, retail, manufacturing, and services sectors. As indicated previously, this number, in terms of dollars, can be quite large. The 1972 business volume figures for some representative DA installation regions are as follows:

Installation	Counties in the Region	1972 Values
Fort Bragg, NC	10	$2,783,328,000
Fort Benning, GA	11	1,644,505,000
Fort Bliss, NM	4	1,490,959,000
Fort Campbell, KY	10	590,504,000
Fort Sam Houston, TX	8	3,075,644,000
Fort Monroe, VA	11	2,958,373,000
Fort Riley, KS	8	528,286,000

One could surmise quite accurately that a large change in military activity would be required to affect the figures shown significantly. Changes in total business volume, although often large, should not be viewed and evaluated in the absence of data which can effectively establish some perspective. The identified impact can be quite large, since impacts are traced through the various sectors and the "multiplier" effect is measured. However, this "multiplier" phenomenon is considered in the definition of total business volume; hence, resultant changes, put in perspective, can have remarkably small impacts on business volume in the aggregate.

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[4] R. D. Webster, et al., *The Economic Impact Forecast System: Description and User Instructions*, Technical Report N-2/ADA027139 (Construction Engineering Research Laboratory [CERL], June 1976).

Change in Total Personal Income

Income includes wages and salary income for work performed as an employee during a specified time. Changes in income may result from changes in the quantity of work performed or products sold, or from changes in the price of labor. DOD activities affect personal income through the direct addition or removal of income and through the resulting secondary effects on DOD-dependent labor services. This effect can be brought about by changes in the number of salaries or wage earners as well as by the alteration of activity levels. For example, the reduction in personal income at a facility could be effected through either a reduction in the number of employees or a reduction in the number of hours worked per employee.

Change in Employment

As in the case of income, the effects of DOD action on employment can take two forms: (1) number of employees, or (2) work effort per employee. Therefore, employment can be measured in two ways: (1) number of employees, and (2) total employment in man-years. These two measures are different, and conversion between the two systems is not simple. The difference in the two concepts is significant, particularly with respect to local controversy. In the latter case, an aggregation occurs, allowing the consideration of both full-time and part-time employees. Considering these various levels of definitions, it can easily be seen that a reduction in 500 man-years of employment will not culminate in 500 unemployed persons. The effects of DOD actions on employment are similar to those of income. The direct impact produces the total effect and can be viewed as a "multiplier" or "ripple" phenomenon.

Impact on Local Government Revenues and Expenditures

Revenues for the operation of local governmental functions will normally fall into one or more of the following categories: property taxes, sales taxes, income taxes, and state or Federal aid. The importance of each revenue category is dependent on the county or municipal government selected. Real estate or property taxes are the most commonly discussed method of providing revenues for local governments. Normally, real property--land, housing, or businesses--is assessed, or an appraisal of its value is performed. This appraisal is usually less than the actual market value, the ratio being set by law in many cases. The property tax rate is then applied to the assessed value, and the appropriate taxes collected.

Federal facilities are exempt from local real property taxation. This exemption can certainly be viewed as a reduction in the total tax base of the community. However, since no revenues are directly received, the opening or closing of a facility has no impact on local real property revenues.

Sales tax revenues are dependent on retail sales receipts. Although the sales tax is often viewed as a state tax, the county or municipal governments are rebated a certain portion of the sales tax revenues for local governmental operation. Often, food items and similar necessities are exempted from sales tax collection. The operation has a significant effect on sales tax revenues through the direct purchases of taxable goods by employees and any portion of economic activity in the retail sales sector which can be taxed.

Income tax revenues are directly related to personal income. Local income taxes are sometimes added to Federal and state income taxes to provide additional local revenues. DOD activities affect the income tax category of revenues through the impact on total regional personal income.

State and Federal aid provide additional revenues for local governments. Although much of this category is actually a rebate of taxes originally collected locally, in many cases, the impact can be substantial. Perhaps the most important DOD-related form of aid is the aid given to schools to support the education of dependents of military employees. Frequently, the support of education under this program can be substantial. The removal of these funds can often have a severe detrimental impact on the affected region. For this reason, programs to insure the gradual reduction of support over time are available for implementation.

Local governmental expenditures cover such services as schools, utilities, and services. Schools are usually designed to accommodate a specified number of students. Fluctuations in this level of activity can be a severe problem. Utilities such as sewer, water, streets, and lighting are often designed for a certain population level or activity pattern. DOD-related changes can alter the designed load, and therefore affect how efficiently these services are used. This lack of efficiency can be a serious problem in instances where a large capital investment has been made and the people necessary to pay for the investment through use of its services are gone.

Changes in Income and Employment Distribution

Both income and employment can be measured in aggregate terms. Although this method is much easier to implement when assessing impacts, potential shortfalls can occur. In the aggregate form, no measure of the distribution is available. Most of the employment or income distribution may be contained in only a few sectors of a local region. This implies a tremendous dependence on these few sectors. An obvious example is the agriculturally-based economy. As revenues in this sector fluctuate, service industries based on this sector also fluctuate. If an economy were DOD-service oriented, those services would fluctuate with installation activity fluctuations. Income distribution measured according to percentage distribution can indicate, to some extent, the region's stability.

Impact on Local Housing

A region's housing market is a good indicator of the area's economic well-being. While increases in housing property value can be attributed to both inflation and increased demand, the demand factor is most susceptible to DOD-related activities. Both an increase in an installation's construction activity and a greater number of personnel living off base can increase the demand for housing. In the former case, the demand is often of short duration, lasting only as the workers reside in the area; in the latter case, the demand is long term only if the additional personnel continue to reside in the community. Reductions in activity almost always affect the demand negatively. These impacts may occur only in certain subregions of the community, or they may be distributed throughout the community, depending on the distribution of affected DOD personnel.

Impact on Regional Economic Stability

When a local economy is based primarily on a small number of economic sectors, an unhealthy dependence on these sectors is established. As the primary movers of the local economy, their business cycles can dictate the condition of the regional economy. Diversity is the key to eliminating these effects. If a DOD action eliminates one principal sector (in many cases, the military sector itself), the elimination reduces the diversity and adversely affects the region's stability.

Impact on Local School Systems

Schools are a form of governmental service. The purely economic ramifications of school impacts can be handled as an impact on the local government's expenditure and revenue balance; however, the social ramifications can require a very different approach. DOD dependents may differ to some degree from their peers in a local school system. These differences may be attributable to their possible increased mobility, different value systems, and different home environments (i.e., living on base as opposed to the civilian off-base community). These social ramifications required additional study.

Impact on Local Government Bond Obligations

Often, local communities will accept the "status quo" as a permanent situation. As a result, financial obligations in support of schools, utilities, and other municipal projects are often easily obtained. When this "status quo" is interrupted, as in the case of DOD reductions, a heavy burden can be placed on the community which can create a tremendous amount of controversy.

Change in Population

Population changes can have both social and economic ramifications. Changes in the social strata because of the removal of people who comprise a large portion of a leadership element or because of changes in local institutions or organizations are examples of social change brought about by population change. Population changes often accompany or trigger the impacts on local government (for example, impacts on schools), and changes in property values.

Change in Welfare and Dependency

The welfare and dependency agencies assist individuals or families who are temporarily unable to provide for themselves, such as the unemployed. Agencies that provide such services are supported by local and state taxation, grants from other governmental levels, and private charitable organizations. Changes in DOD-related employment and income directly affect the operation of these processes.

Change in Social Control

Social control includes such services as law enforcement, court activities, and related actions. If the number of military and associated personnel increases, there will be a greater demand for social control services.

Aesthetic Considerations

The economic and social well-being of a region is often indicated through somewhat nebulous aesthetic qualities. A region suffering reductions in economic vitality is often characterized by vacant buildings, high unemployment, and other factors which tend to promote a bad concept of the community to prospective businesses or residents. While hard to define, the general atmosphere and aesthetic appearance of a community are indicative of such a situation.

These elements represent those agreed upon by personnel familiar with NEPA and recent controversial court actions related to DOD mission changes and realignments. Consideration of these elements would insure the proper environmental analysis of socioeconomic impacts connected with DOD actions. Although closely related and mutually dependent, these factors are all individually important when assessing the magnitude of proposed DOD-related changes.

3 IDENTIFICATION OF THE RTV TECHNIQUE

Basis for Development of Indicators

To assess the "significance" and derivation of rational threshold values, the list of elements provided in Chapter 2 must be reduced to insure that the RTV technique is an efficient tool. Assessment can be based on the following considerations.

Predictive Capability of Existing Forecasting Techniques

Regional economics is, at first glance, a very quantitative science. The overall accuracy of state-of-the-art forecasting techniques is still subject to controversy, even among prominent practitioners. Elements used to evaluate predicted impacts should be chosen so as not to imply an accuracy that is not available. Once an indicator variable is selected, some assurance of the ability to estimate that variable is essential. If no measurement can be assured, standards of evaluation are not useful.

Availability of Data to Adequately Address the Identified Problem

Given that sufficient analysis procedures exist, the availability of adequate data to drive the predictive system should also be assured. The analysis or estimation of regional economic change can be divided into three stages: data acquisition, impact estimation, and impact evaluation. The RTV value itself can be used in the latter stages, and many techniques can be chosen to address the middle stage; however, the data acquisition stage is often the limiting factor. The best predictive technique cannot be used if its data requirements are unreasonable.

Relative Cost of Effective Implementation

The three phases of economic analysis must be combined into one systematic tool. The resource requirements of the total tool must be low enough to insure that it can be used in daily operations. The cost of its implementation is directly related to the data requirements, the sophistication of the subsystems, and the number of indicator variables.

Selection of Preliminary Indicators

Following the establishment of these considerations as prime factors in developing the RTV system, elements were consolidated as shown in Figure 1.

The development of the preliminary scheme shown was predicated principally on the considerations of predictive capability, data availability, and relative cost.

Changes in business volume, employment, personal income, and population are the indicators for these elements; however, population is also an indicator for other significant impacts or elements, as shown in Figure 1. The heavy dependence on population of these variables is based principally on the role of a population shift in significantly changing them. Any impacts on the four variables indicated (local government revenues and expenditures, local housing, local school systems, and local bond obligations) would be accompanied and probably driven by a population change. Other problems which might materialize without the population change (for example, if employment were reduced) are still addressed by remaining variables: welfare and dependency, social control, employment and income distribution, etc.

Analysis of Selected Indicators

After the elements or indicators were selected, a means of analyzing them was required. Since some change in a DOD-related activity would be the basis for using the RTV technique, a reasonable approach seemed to be analyzing historical changes. An analysis, both in a temporal and spatial sense would, to some extent, indicate a region's fluctuating trends. Since temporal data is normally the series used for this type of analysis, fluctuation of the variables over time was selected as the analysis element.

Figure 2 generally indicates the type of analysis which can be made. The curved line indicates the normal type of growth which can be seen on the majority of plots for any community. As shown, a straight line can be drawn between the final and starting points of the growth curve. This has an averaging effect and tends to indicate very clearly the type of fluctuation exhibited by the community under study. Figure 3 is an additional visualization of the fluctuation. Deviations from the average are plotted. For example, if a growth of 3 percent were shown in a time interval, and the average rate were 5 percent, a negative 2 percent would be plotted. If a growth rate in excess of the average were shown, a positive deviation would be indicated. The concept is simply based on the creation of a "yardstick" against which a specified change may be compared, thus establishing some perspective.

Indicators	Elements
Change in Business Volume	Change in Business Volume
Change in Personal Income	Change in Personal Income
Change in Employment	Change in Employment
Change in Population	Change in Population
	Impact on Local Government Revenues and Expenditures
	Impact on Local Housing
	Impact on Local School Systems
	Impact on Local Government Bond Obligations
	Change in Welfare and Dependency
Change in Social Control	
Aesthetic Considerations	
Changes in Income and Employment Distribution	
Impact on Regional Economic Stability	

Figure 1. Resultant preliminary indicators.

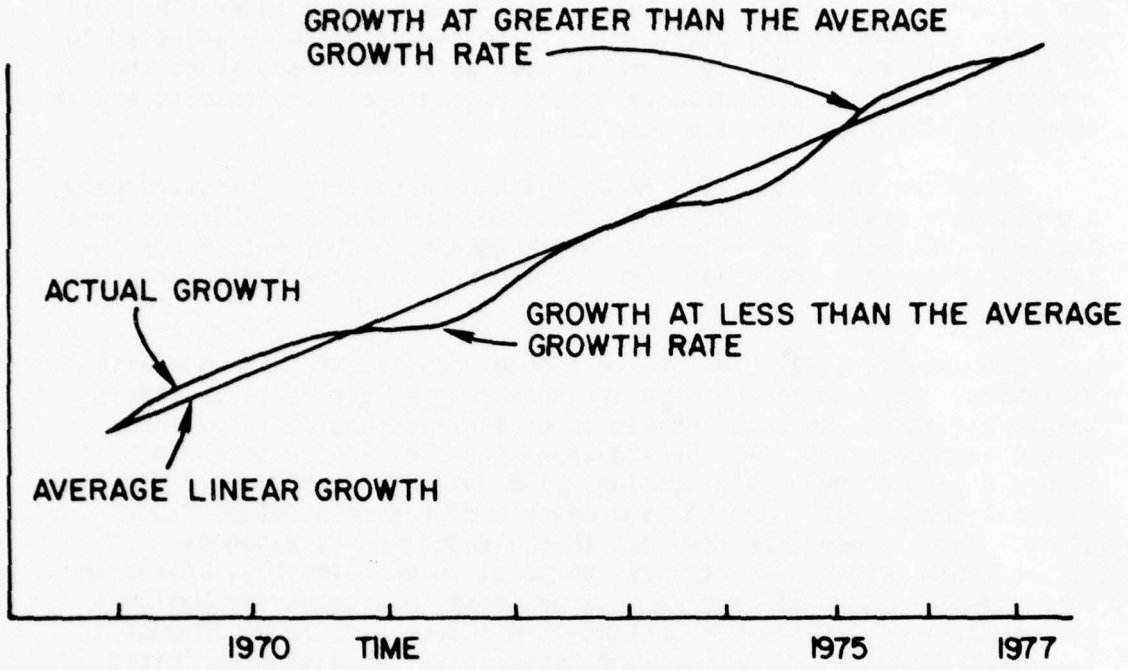

Figure 2. Analysis of variable X.

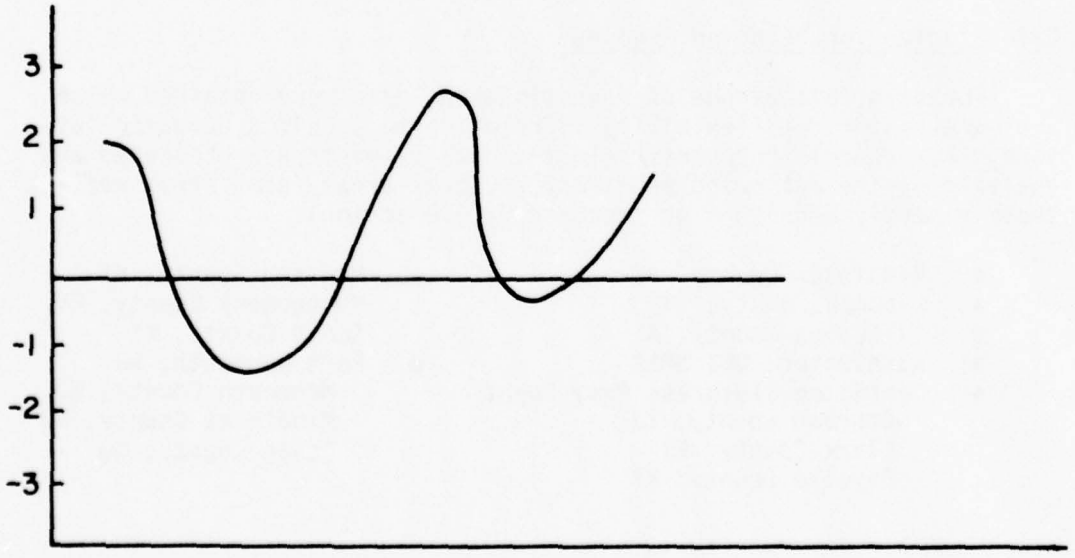

Figure 3. Yearly percentage deviation in variable X.

Inflationary trends must be considered in cases where dollar values are used. Otherwise, a bias in favor of growth would be developed and the resultant trend would not represent the true fluctuation. To adjust for inflation of the dollar values, the Consumer Price Index (CPI) was used for the appropriate years, and all dollar values were adjusted to 1967 equivalents. (1967 is normally used as a base year; since the threshold values will eventually become percentages, the results are the same, regardless of the base year used.)

After the indicators and an approach were selected, existing data sources were reviewed. The source selected was the Bureau of Economic Analysis (BEA) data series which covers income, employment, and population. Figures 4 and 5 indicate the type of data available from this source.

BEA data is available for the income, employment, and population variables. No good source with an adequate time series for business volume was found, so some indication of the fluctuation in business volume was necessary. The breakdown of personal income shown in Figure 4 seemed the most promising. The "nonfarm" category of total personal income was selected as a measure of business volume fluctuation. This is based on the fact that a reduction in business volume would tend to affect total personal income directly. Although over adjustments could be made in a business to account for business slumps, such as inventory reduction, the income picture would most likely be affected. At worst, the historical fluctuation exhibited would be less than that found in a "true" business volume measure. Therefore, the resultant analysis would probably be conservative.

Case Studies for Selected Regions

Pursuing this avenue of investigation, data were obtained which indicate historical flexibility in relation to specific economic factors. For example purposes, selected data elements are presented and analyzed on the following arbitrary regional areas (some areas reflect those recently addressed or impacted by DOD action):

- Middlesex County, NJ
- Lubbock County, TX
- Talledega County, AL
- Washington, DC, SMSA
- Lexington-Bluegrass Army Depot
  - Bourbon County, KY
  - Clark County, KY
  - Fayette County, KY
  - Madison County, KY
  - Montgomery County, KY
  - Scott County, KY
- Fort Monmouth, NJ
  - Monmouth County, NJ
  - Middlesex County, NJ
  - Ocean County, NJ

CHAMPAIGN ILLINOIS — PERSONAL INCOME BY MAJOR SOURCES 1970-75 (THOUSANDS OF DOLLARS)

ITEM	1970	1971	1972	1973	1974	1975
TOTAL LABOR AND PROPRIETORS INCOME BY PLACE OF WORK 1/						
BY TYPE						
WAGE AND SALARY DISBURSEMENTS 2/	423,595	472,196	503,896	553,468	589,356	616,501
OTHER LABOR INCOME	12,111	13,857	16,206	17,739	20,794	24,151
PROPRIETORS INCOME	45,648	58,531	57,252	86,276	86,045	101,617
FARM	16,006	27,699	24,249	51,991	53,443	66,354
NONFARM	29,642	30,832	33,003	34,285	32,602	35,263
BY INDUSTRY						
FARM	17,213	28,893	25,518	53,518	55,164	68,659
NONFARM	464,141	515,691	551,836	603,965	641,011	673,610
PRIVATE	239,944	262,895	281,147	304,739	337,638	364,731
MANUFACTURING	42,847	43,363	46,993	54,398	63,278	71,750
MINING	606	651	1,012	890	1,056	802
CONTRACT CONSTRUCTION	31,025	39,429	40,021	40,482	40,712	39,600
WHOLESALE AND RETAIL TRADE	69,428	74,962	81,469	91,927	103,174	111,642
FINANCE, INSURANCE, AND REAL ESTATE	10,887	12,475	13,911	14,814	16,029	18,663
TRANSP., COMM. + PUBLIC UTILITIES	21,519	22,699	24,663	26,855	29,818	31,580
SERVICES	62,461	67,869	71,783	74,006	82,177	89,348
OTHER INDUSTRIES	1,169	1,447	1,295	1,367	1,392	1,346
GOVERNMENT	224,197	252,796	270,689	299,226	303,373	308,879
FEDERAL, CIVILIAN	31,700	33,179	34,243	34,667	38,404	40,542
FEDERAL, MILITARY	72,077	86,425	89,225	103,079	94,365	75,517
STATE AND LOCAL	120,420	133,192	147,221	161,460	170,604	192,420
DERIVATION OF PERSONAL INCOME BY PLACE OF RESIDENCE						
TOTAL LABOR AND PROPRIETORS INCOME BY PLACE OF WORK	481,354	544,584	577,354	657,483	696,195	742,269
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE BY PLACE OF WORK	20,324	21,932	24,189	26,380	30,004	32,379
NET LABOR AND PROPRIETORS INCOME BY PLACE OF WORK	461,030	522,652	553,165	631,103	666,191	709,890
PLUS: RESIDENCE ADJUSTMENT	-21,556	-24,440	-26,359	-28,455	-30,193	-31,452
NET LABOR AND PROPRIETORS INCOME BY PLACE OF RESIDENCE	439,474	498,212	526,806	602,648	635,998	678,438
PLUS: DIVIDENDS, INTEREST, AND RENT	87,220	94,399	100,070	110,444	123,407	132,496
PLUS: TRANSFER PAYMENTS	48,091	54,892	62,734	72,395	83,025	102,887
PERSONAL INCOME BY PLACE OF RESIDENCE	574,785	647,503	689,610	785,487	842,430	913,819
PER CAPITA INCOME	3,516	3,960	4,249	4,778	5,128	5,592
TOTAL POPULATION (THOUSANDS)	163.5	163.5	162.3	164.4	164.3	163.4

1/ EQUALS THE SUM OF WAGES, OTHER LABOR INCOME AND PROPRIETORS INCOME
2/ PRIMARY SOURCE FOR PRIVATE NON-FARM WAGES: ES-202 COVERED WAGES - ILLINOIS BUREAU OF EMPLOYMENT SECURITY

TABLE 5.00

REGIONAL ECONOMICS INFORMATION SYSTEM
BUREAU OF ECONOMIC ANALYSIS

Figure 4. Income statistics available from BEA.

EMPLOYMENT BY TYPE AND BROAD INDUSTRIAL SOURCES 1971-75
FULL AND PART-TIME WAGE AND SALARY EMPLOYMENT PLUS NUMBER OF PROPRIETORS

CHAMPAIGN ILLINOIS

	1971	1972	1973	1974	1975
TOTAL EMPLOYMENT	75,017	74,850	79,079	79,553	77,985
NUMBER OF PROPRIETORS	7,105	7,301	7,271	7,268	7,241
FARM PROPRIETORS	2,447	2,448	2,431	2,414	2,379
NON-FARM PROPRIETORS	4,658	4,853	4,840	4,854	4,862
WAGE AND SALARY EMPLOYMENT	67,912	67,549	71,808	72,285	70,744
FARM	375	380	410	428	520
NON-FARM	67,533	67,169	71,398	71,857	70,224
GOVERNMENT	33,192	32,206	34,002	33,524	32,323
TOTAL FEDERAL	14,528	13,249	14,454	12,994	10,796
FEDERAL CIVILIAN	3,519	3,382	3,906	3,808	3,619
MILITARY	11,009	9,867	10,548	9,186	7,177
STATE AND LOCAL	18,664	18,957	19,548	20,530	21,527
PRIVATE NON-FARM 1/	34,341	34,963	37,396	38,333	37,901
MANUFACTURING	4,729	4,904	5,958	6,127	6,264
MINING	63	103	76	95	61
CONSTRUCTION	3,366	3,221	3,552	2,971	2,582
TRANSPORT.,COMM., AND PUBLIC UTILITIES	2,407	2,460	2,399	2,526	2,450
TRADE	12,451	12,910	13,812	14,214	14,121
FINANCE, INSURANCE, AND REAL ESTATE	1,435	1,562	1,684	1,781	1,932
SERVICES	9,744	9,708	10,046	10,451	10,357
OTHER	146	95	125	168	134

1/ PRIMARY SOURCE FOR PRIVATE NON-FARM EMPLOYMENT: ES-202 COVERED EMPLOYMENT. ILLINOIS BUREAU OF EMPLOYMENT SECURITY

TABLE 25.00

REGIONAL ECONOMIC INFORMATION SYSTEM
BUREAU OF ECONOMIC ANALYSIS

Figure 5. Employment statistics available from BEA.

- Fort Wolters, TX
  - Collin County, TX
  - Dallas County, TX
  - Denton County, TX
  - Ellis County, TX
  - Eastland County, TX
  - Erath County, TX
  - Hood County, TX
  - Johnson County, TX
  - Kaufman County, TX
  - Palo Pinto County, TX
  - Parker County, TX
  - Rockwell County, TX
  - Stephens, County, TX
  - Tarrent County, TX

The tentative results of these studies are shown in Tables 1 through 16 and Figures 6 through 21. Not all factors are plotted, but trends are indicated. Before reviewing the figures, the following additional explanations should be noted:

1. The average yearly rate of change is shown as a percentage based on the last year of record.

2. The maximum fluctuations are also shown as percentages, which are calculated by dividing the deviation by the element's value for the first year of the time interval.

The calculations used to produce the curves are self-explanatory. Dollar values were adjusted, using Wholesale and Consumer Price Indices to correct for inflationary trends. The resulting figures are 1967 dollars. Since percentages are obtained for thresholds, using the base year should not affect using the thresholds to evaluate project impact.

The case studies, although few in number, imply two principal conclusions:

1. The "natural" or historical fluctuations in the plotted economic elements indicate that regions differ both in cycle and in magnitude of fluctuation. Hence, any attempt to use a "national" percentage figure for a specific community could be misleading and would be subject to court challenges; however, using the data available for a specific region, it would be easy to defend threshold values which are region-specific.

2. There are some problems with data availability for a time sufficient to adequately address the problem. This is particularly true for investigating employment trends; however, a "band" of acceptable impact levels can be derived, based on available information. This would be conservative, in that the range would be smaller than if the curves were allowed to reach the optimum level on either the positive or the negative scale. Extending the curves in either direction would result in a wider range, and hence higher absolute thresholds.

Table 1

Employment Trends, Middlesex Co., NJ

Year	1 Employment (x 10^3)	2 Change in Employment (x 10^3)	3 Average Yearly Change (x 10^3)	4 Deviation From Average (x 10^3) (Col 2 minus Col 3)
67	205.1		8.4	
68	211.6	6.5		-1.9
69	218.4	6.8		-1.6
70	227.4	9.0		.6
71	230.0	2.6		-5.8
72	238.7	8.7		0.3
73	255.5	16.8		8.4

$(8.4/238.7) \times 100$

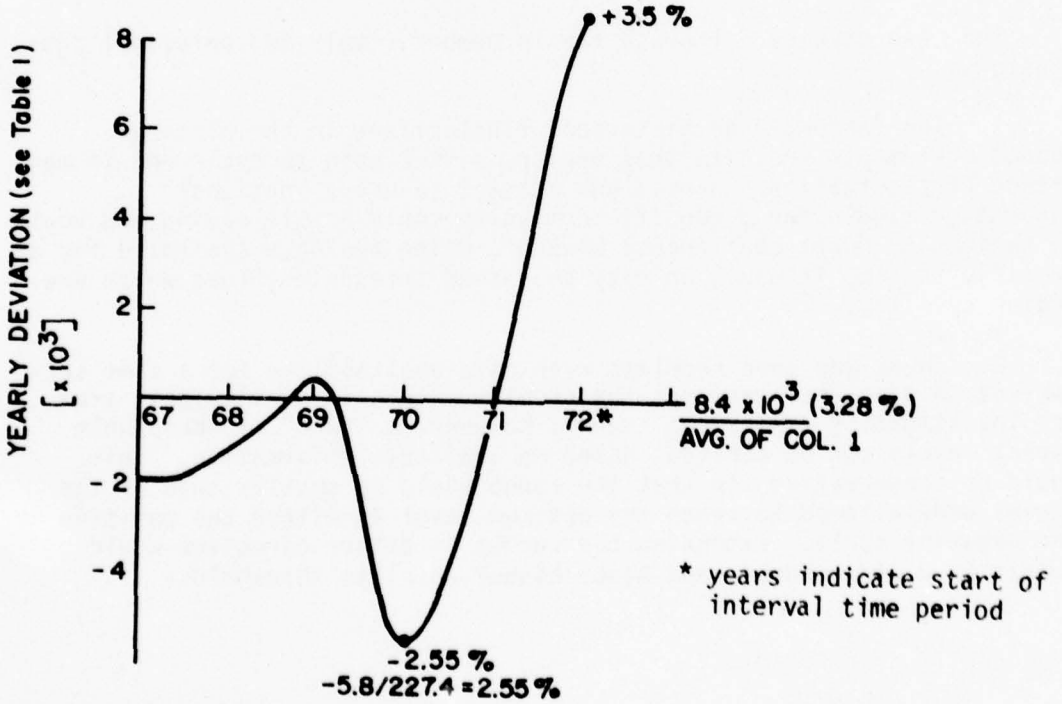

Figure 6. Deviation in average yearly growth rate employment for Middlesex Co., NJ.

Table 2

Personal Income Trends, Middlesex Co., NJ

Year	Personal Income (10^6)	Adjusted to 1967 Dollars	Change (10^6)	Average Yearly Change	Deviation From Yearly Change
65	1619	1712		108.63	
			94		
66	1756	1806			-14.63
			122		
67	1928	1928			13.37
			109		
68	2123	2037			.37
			129		
69	2378	2166			20.37
			89		
70	2623	2255			-19.63
			92		
71	2847	2347			-16.63
			141		
72	3118	2488			32.37
			93		
73	3435	2581			-15.63

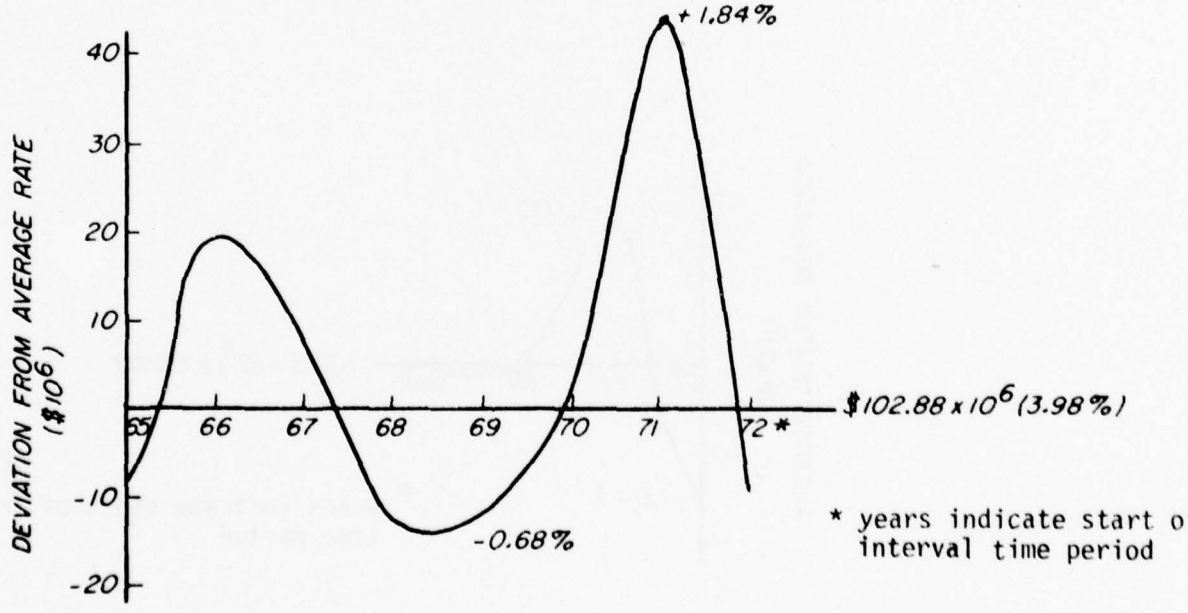

Figure 7. Deviation in average yearly growth rate in personal income (adjusted to 1967 dollars), Middlesex Co., NJ.

Table 3

Employment Trends, Lubbock Co., TX

Year	Employment ($\times 10^3$)	Change in Employment ($\times 10^3$)	Average Yearly Change ($\times 10^3$)	Deviation from Average Yearly Change
1967	68.9		1.525	
		.8		-.725
1968	69.7			
		2.3		+.775
1969	72.0			
		1.5		-.025
1970	73.5			
		1.5		-.025
1971	75.0			

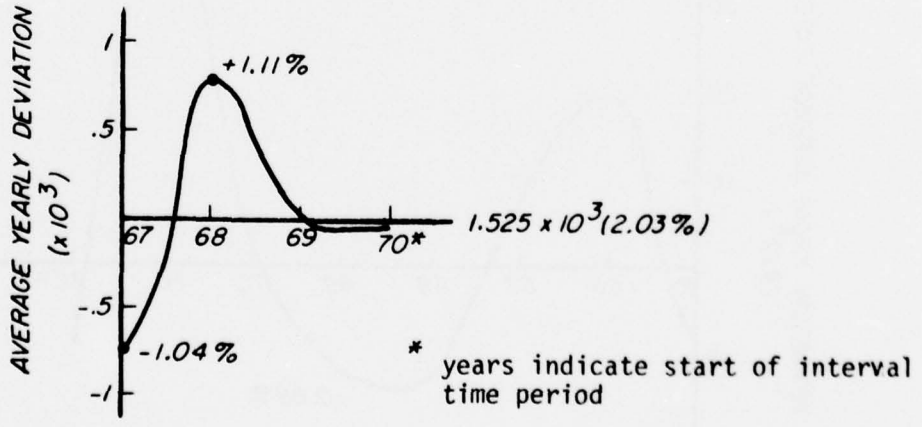

Figure 8. Deviation from average yearly growth rate of employment, Lubbock Co., TX.

Table 4

Personal Income Trends, Lubbock Co., TX

Year	Personal Income	Adjusted to 1967 Dollars	Change ($\$10^6$)	Average Yearly Change	Deviation From Yearly Change
1965	446.4	472.2		14.52	
			17.10		2.58
1966	475.6	489.3			
			8.8		-5.72
1967	498.1	498.1			
			12.2		-2.32
1968	531.6	510.3			
			13.8		- .72
1969	575.3	524.1			
			29.05		14.53
1970	643.2	553.15			
			6.18		-8.34
1971	678.8	559.33			

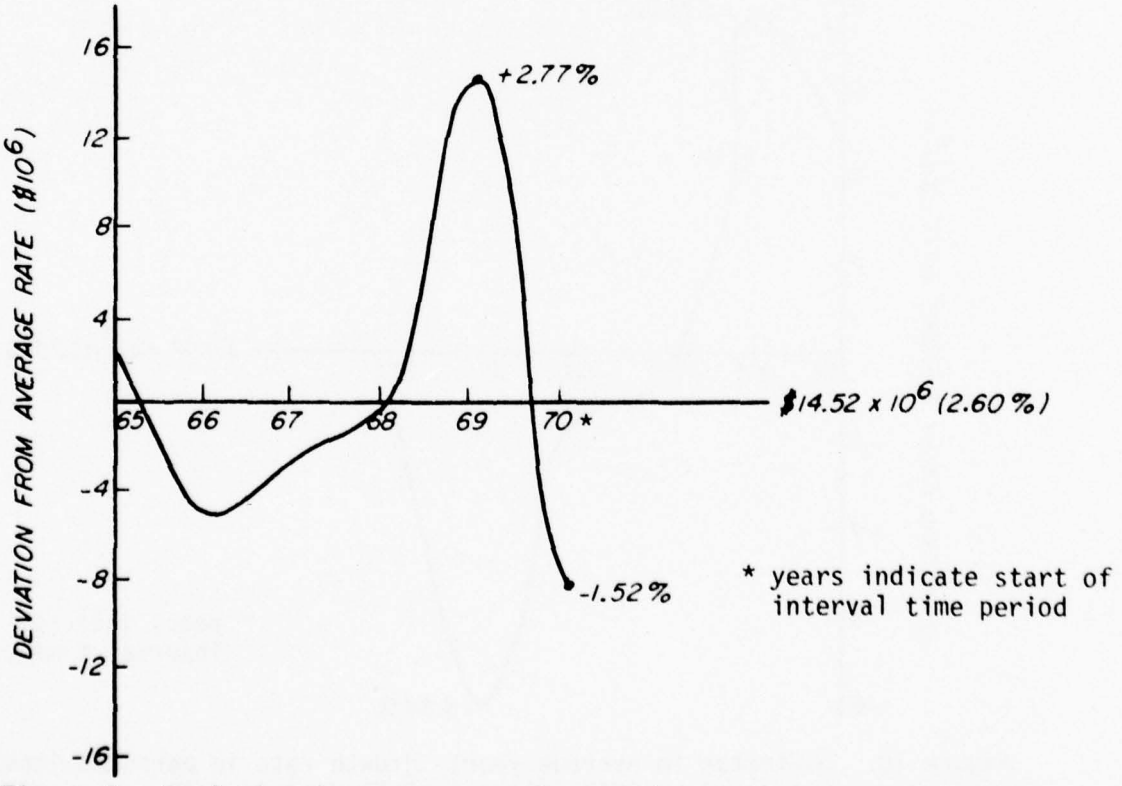

Figure 9. Deviation in average yearly growth rate in personal income (adjusted to 1967 dollars), Lubbock Co., TX.

Table 5

Personal Income Trends, Talladega Co., AL

Year	Personal Income	Adjusted to 1967 Dollars	Change (10^6)	Average Yearly Change	Deviation From Yearly Change
1965	116.2	122.9		4.97	
			9.6		4.63
1966	128.8	132.5			
			12.6		7.63
1967	145.1	145.1			
			4.0		-.97
1968	155.4	149.1			
			3.6		-1.37
1969	167.7	152.7			
			-3.5		-8.47
1970	173.5	149.2			
			3.5		-1.47
1971	185.4	152.7			

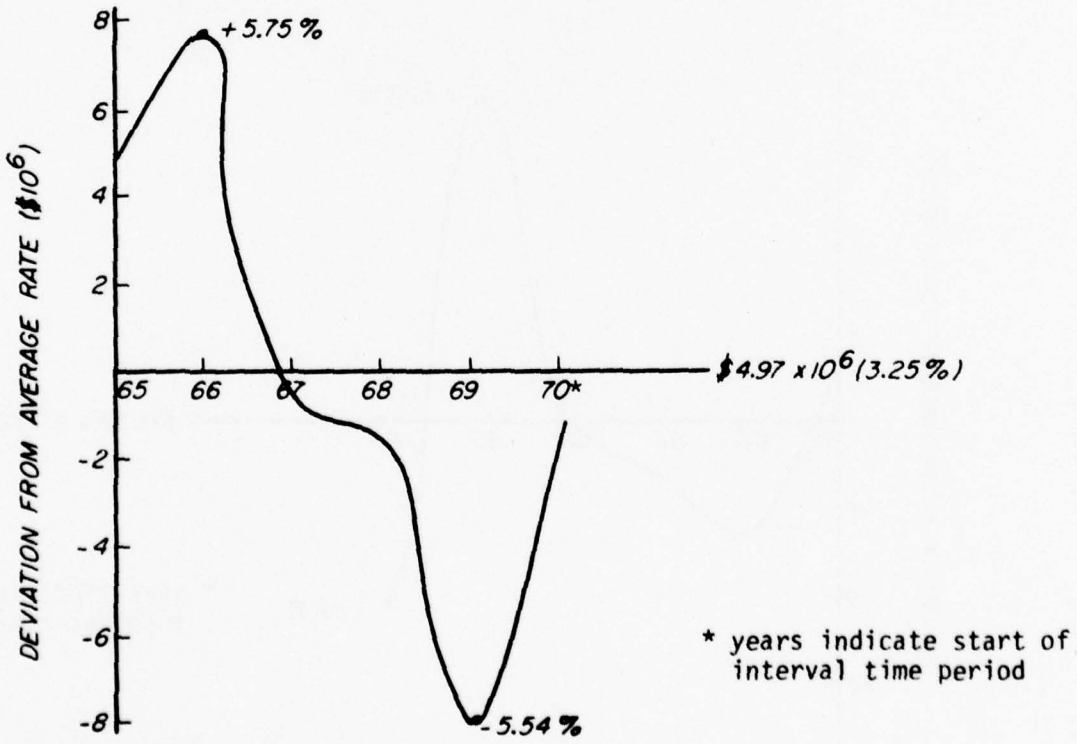

Figure 10. Deviation in average yearly growth rate in personal income (adjusted to 1967 dollars), Talladega Co., AL.

Table 6

Personal Income Trends, Washington, DC, SMSA

Year	Personal Income	Adjusted to 1967 Dollars	Change ($\$10^6$)	Average Yearly Change	Deviation From Yearly Change
1965	9000	9520		650.5	-119.5
			531		
1966	9768	10051			-128.5
			522		
1967	10573	10573			46.5
			697		
1968	11743	11270			-80.5
			570		
1969	13000	11840			89.5
			740		
1970	14630	12580			57.5
			593		
1971	15979	13173			363.5
			1014		
1972	17776	14187			-113.5
			537		
1973	19598	14724			

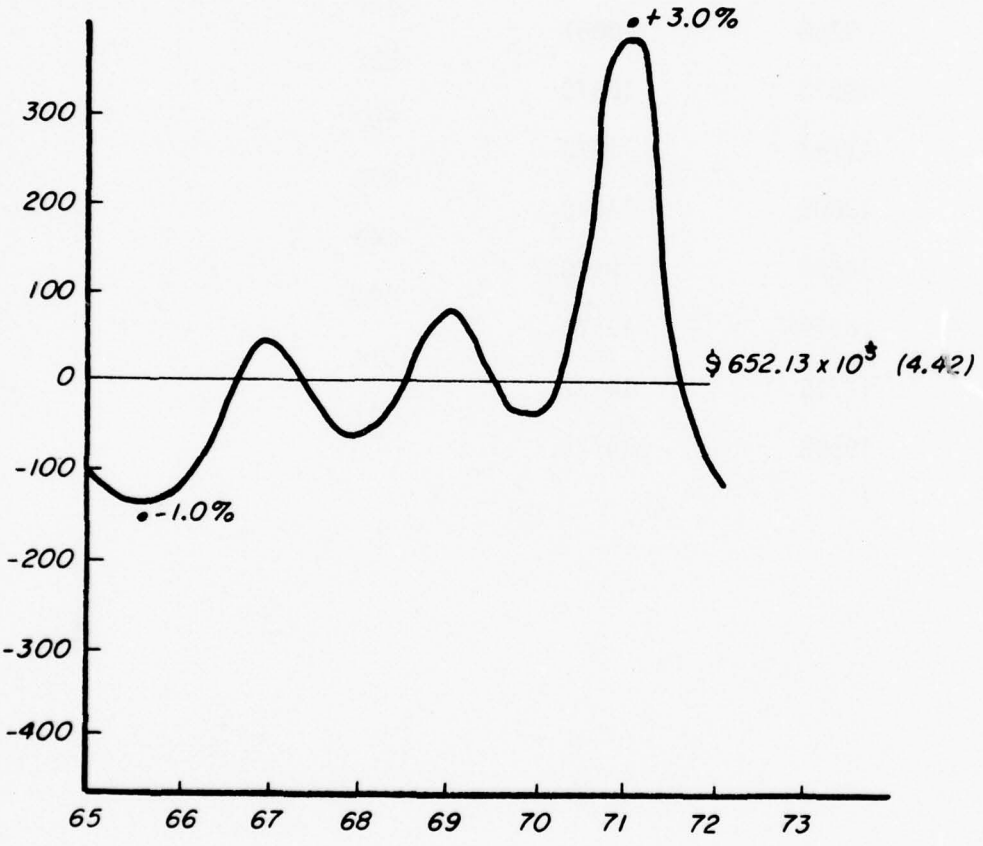

Figure 11. Deviation from average yearly growth rate in personal income (adjusted to 1967 dollars), Washington, DC, SMSA.

Table 7

Wholesale and Retail Trade Trends (10^6), Lexington-Bluegrass Army Depot

Year	County						Totals	Adjusted to 1967 Dollars	Change (10^6)	Average Yearly Change	Deviation From Yearly Change
	Bourbon	Clark	Fayette	Madison	Montgomery	Scott					
1965	3.9	6.0	66.0	8.9	3.8	2.9	91.5	96.8		4.87	
									6.0		1.13
1966	4.3	6.5	72.1	9.7	4.1	3.1	99.8	102.8			
									4.4		- .47
1967	4.5	7.0	77.7	10.3	4.4	3.3	107.2	107.2			
									5.1		.23
1968	4.9	7.2	84.5	12.2	4.5	3.7	117.0	112.3			
									4.0		- .87
1969	4.6	7.8	93.0	13.6	4.9	3.8	127.7	116.3			
									2.6		-2.27
1970	4.9	8.7	100.4	14.9	5.3	4.1	138.3	118.9			
									3.4		-1.47
1971	5.1	8.6	109.6	14.8	5.9	4.5	148.5	122.3			
									10.1		5.23
1972	5.6	9.3	121.6	17.7	6.8	4.8	165.8	132.4			
									3.4		-1.47
1973	5.9	10.4	134.6	16.8	8.0	5.0	180.7	135.8			

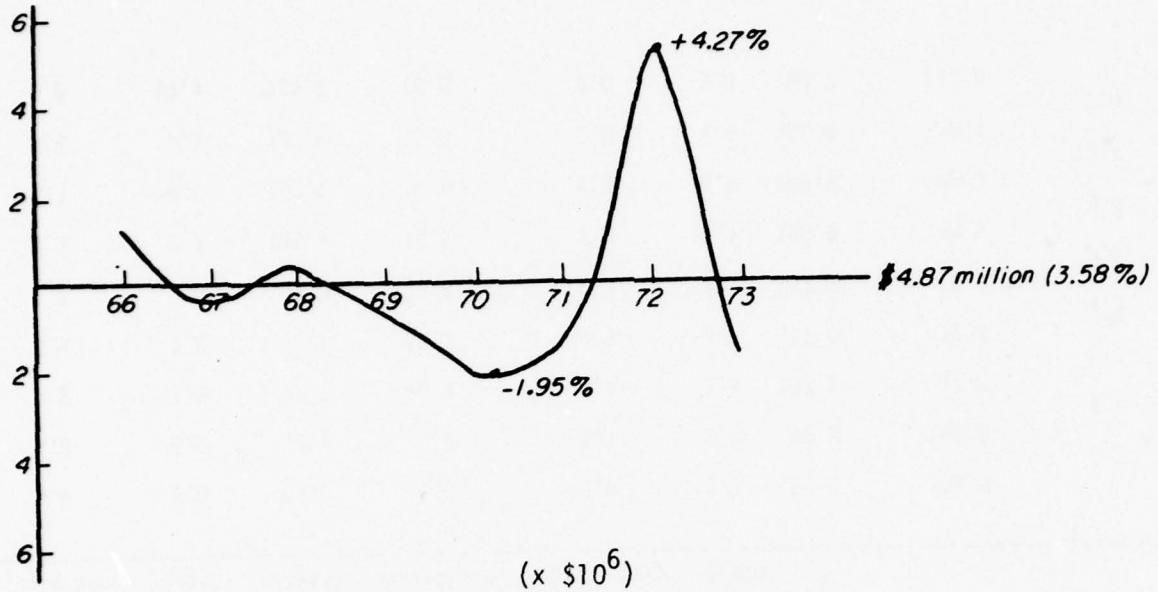

Figure 12. Deviation in average yearly growth rate in wholesale and retail trade, Lexington-Bluegrass Army Depot.

Table 8

Employment Trends, Lexington-Bluegrass Army Depot

Year	County						Employment ($x10^3$)	Change in Employment ($x10^3$)	Average Yearly Change ($x10^3$)	Deviation From Average ($x10^3$)
	Bourbon	Clark	Fayette	Madison	Montgomery	Scott				
1969	7581	10805	94190	16655	7234	6496	142961		4625	
								924		-3701
1970	7443	10850	94935	16667	7538	6452	143885			
								1481		-3144
1971	7375	10997	96312	16693	7273	6716	145366			
								6197		1572
1972	7230	11941	100605	16927	7682	7178	151563			
								9899		5274
1973	7654	12653	106722	18123	8633	7677	161462			

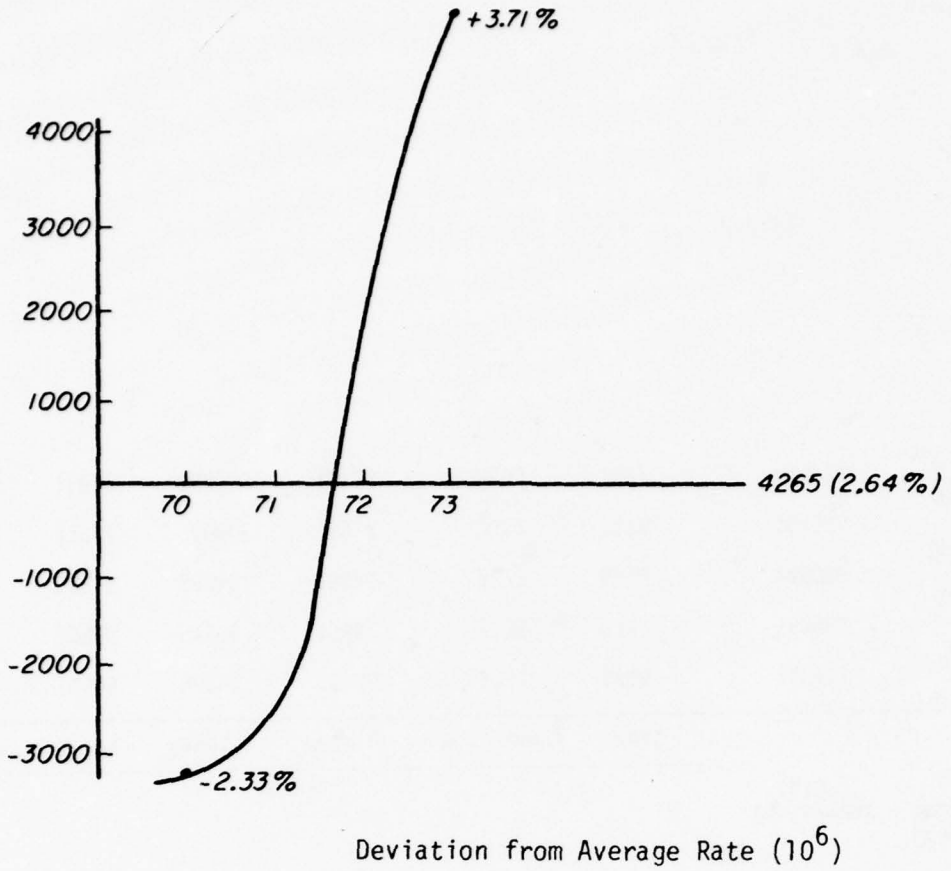

Figure 13. Deviation in average yearly growth rate of employment, Lexington-Bluegrass Army Depot.

Table 9

Personal Income Trends (10^6), Lexington-Bluegrass Army Depot

Year	County						Totals	Adjusted to 1967 Dollars	Change (10^6)	Average Yearly Change	Deviation From Yearly Change
	Bourbon	Clark	Fayette	Madison	Montgomery	Scott					
1962											
1963											
1964											
1965	41.0	54.2	438.3	68.0	25.4	36.5	663.4	701.87		42.68	
1966	45.1	59.3	484.7	78.1	28.0	40.6	735.8	757.13	55.26		12.58
1967	46.7	62.5	519.6	82.0	29.4	42.3	782.5	782.5	25.37		-17.31
1968	53.4	71.1	581.4	82.0	36.2	45.6	879.4	844.0	61.5		18.82
1969	58.3	78.7	633.3	101.0	38.9	48.8	959	873.4	29.44		-13.24
1970	61.1	82.6	681.1	106.7	43.7	50.9	1026.1	882.29	8.85		-33.83
1971	65.0	94.6	740.6	114.8	45.7	56.4	1117.1	920.9	38.61		- 4.07
1972	70.2	108.3	827.9	128.2	52.5	63.9	1251	998.40	77.5		34.50
1973	81.2	120.4	910.0	144.1	60.9	72.0	1388.6	1043.37	44.87		2.19

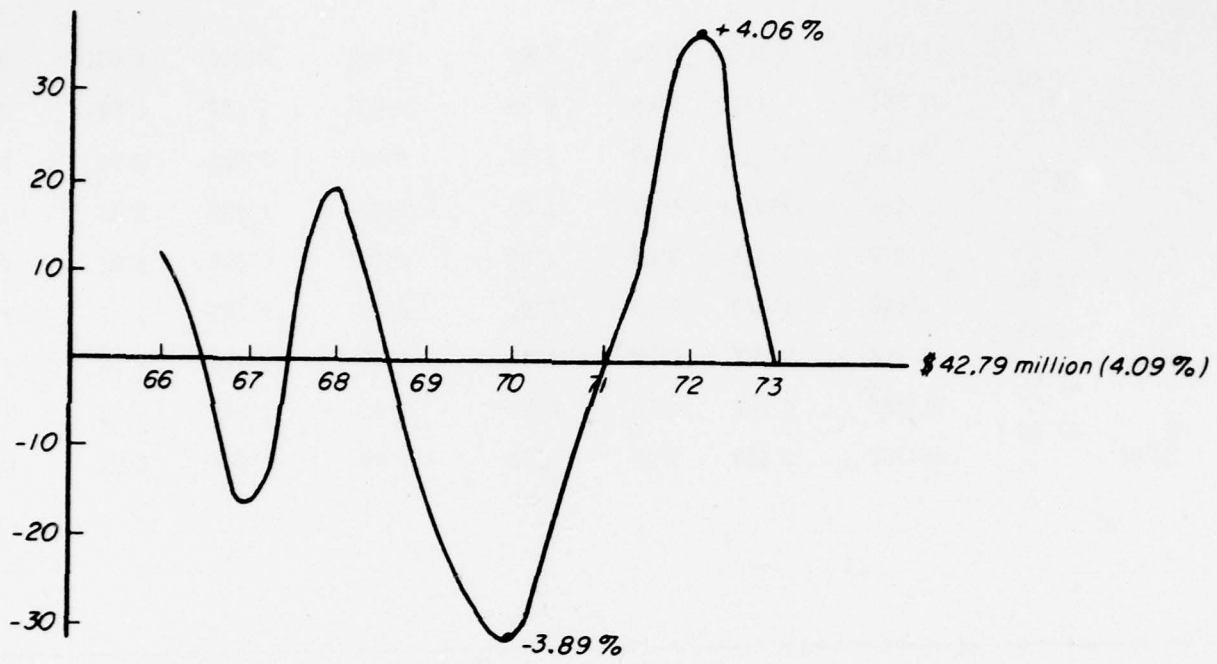

Figure 14. Deviation in average yearly growth rate in personal income (adjusted to 1967 dollars), Lexington-Bluegrass Army Depot.

Table 10

Population Trends, Lexington-Bluegrass Army Depot

Year	County						Total Population	Change ($x10^3$)	Average Yearly Change	Deviation From Yearly Change
	Bourbon	Clark	Fayette	Madison	Montgomery	Scott				
1965	18.9	23.4	153.9	41.7	14.8	17.4	270.1		4.81	
								2.6		-2.21
1966	18.8	23.2	157	41.8	14.7	17.2	272.7			
								1.0		-3.81
1967	18.9	23.3	157.2	42.4	14.7	17.2	273.7			
								7.3		2.49
1968	18.5	23.6	165.3	41.1	15.0	17.5	281			
								5.2		.39
1969	18.4	23.8	169.3	41.8	15.2	17.7	286.2			
								7.8		2.99
1970	18.5	24.2	175.	42.9	15.4	18.0	294			
								3.8		-1.01
1971	18.6	25.0	177.3	43.1	16.0	17.8	297.8			
								8.0		3.19
1972	18.6	25.7	182.4	44.7	16.5	17.9	305.8			
								2.8		-2.01
1973	18.8	25.6	184.6	44.6	16.5	18.5	308.6			

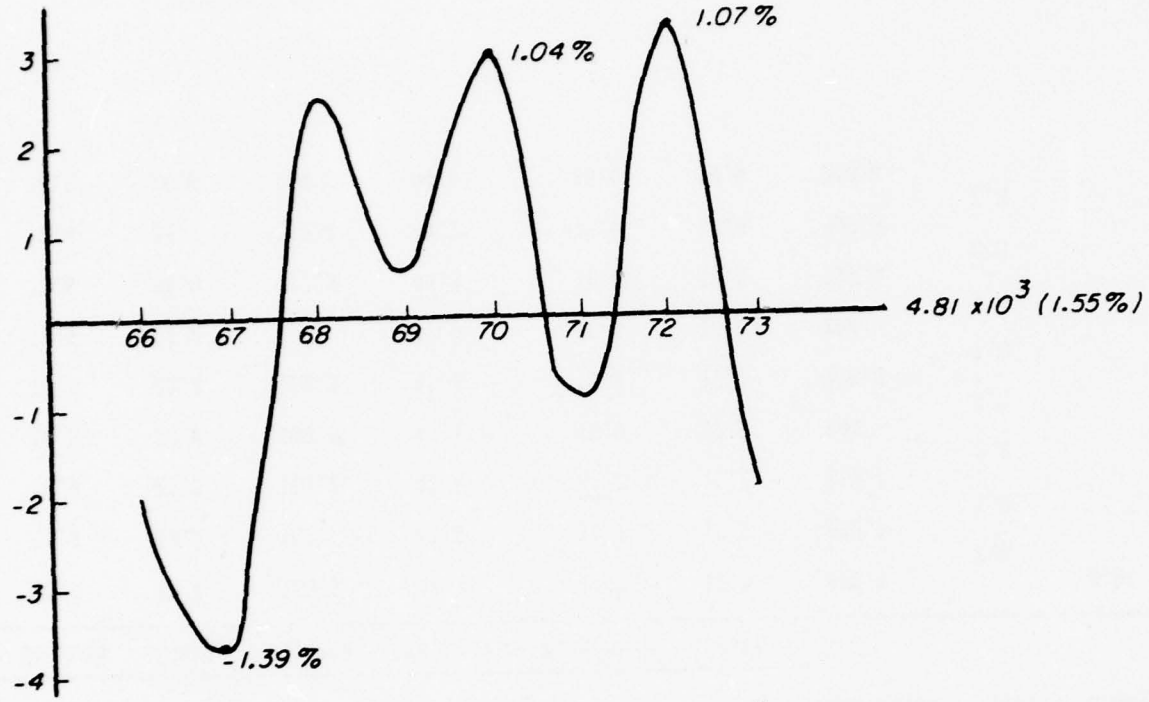

Figure 15. Deviation in average yearly growth rate in population, Lexington-Bluegrass Army Depot.

Table 11

Employment Trends, Fort Monmouth, NJ

Year	Middlesex County	Monmouth County	Ocean County	Employment ($\times 10^3$)	Change in Employment ($\times 10^3$)	Average Yearly Change ($\times 10^3$)	Deviation From Average ($\times 10^3$)
1969	219.2	150.9	50.5	420.6		17.07	
					13.7		- 3.37
1970	228.7	151.	54.6	434.3			
					10.4		- 6.67
1971	231.7	154.8	58.2	444.7			
					13.8		- 3.27
1972	238.7	156.	63.8	458.5			
					30.4		13.33
1973	255.5	163.5	69.9	488.9			

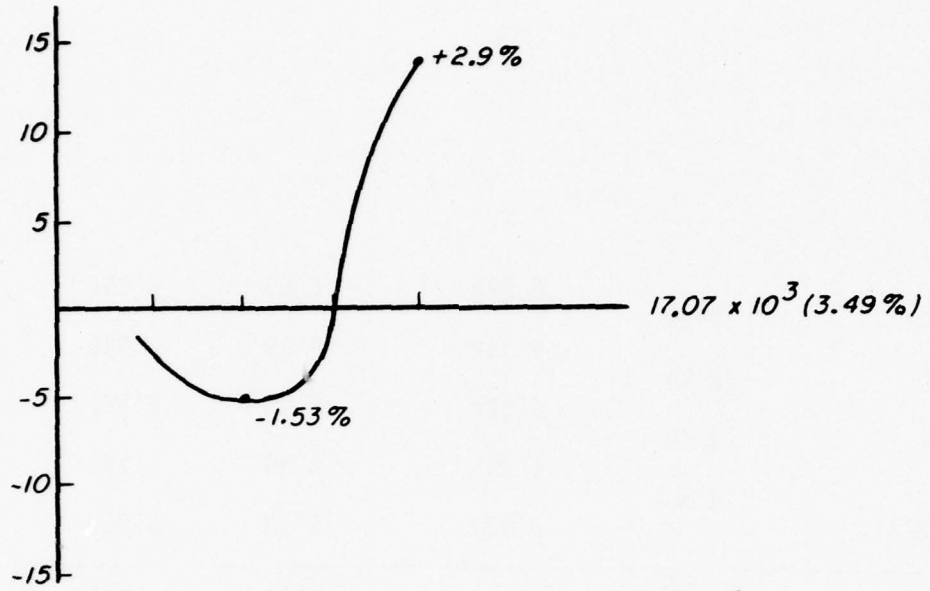

Figure 16. Deviation in average yearly growth rate of employment, Fort Monmouth, NJ.

Table 12

Personal Income Trends, Fort Monmouth, NJ

Year	Middlesex County	Monmouth County	Ocean County	Personal Income	Adjusted to 1967 Dollars	Change (10^6)	Average Yearly Change	Deviation From Yearly Change
1962								
1963								
1964								
1965								
1966								
1967								
1968								
1969	2,378	1,968	749	5095	4641		245.25	
1970	2,623	2,151	864	5638	4848	207		-38.25
1971	2,847	2,343	981	6171	5084	236		- 9.25
1972	3,118	2,537	1,121	6776	5414	330		84.75
1973	3,435	2,783	1,259	7477	5622	208		-37.25
						981		

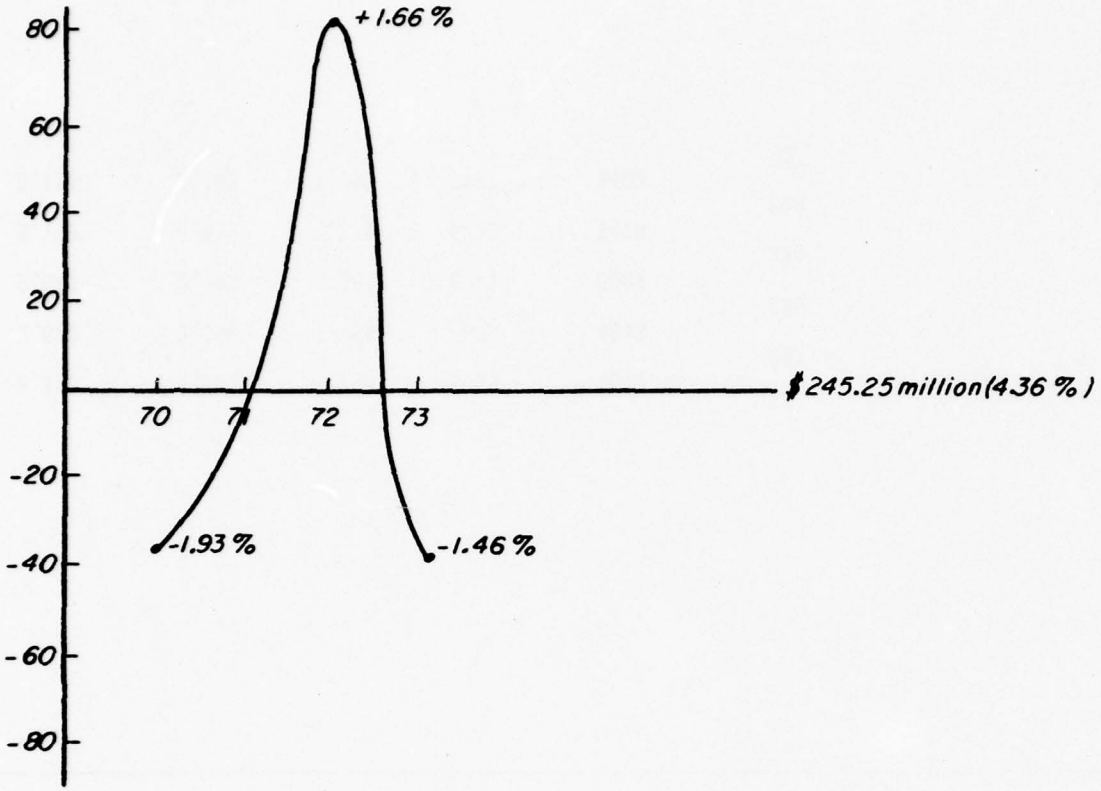

Figure 17. Deviation in average yearly growth rate in personal income (adjusted to 1967 dollars), Fort Monmouth, NJ.

Table 13

Population Trends (10^3), Fort Monmouth, NJ

Year	Middlesex County	Monmouth County	Ocean County	Total Population	Change (10^3)	Average Yearly Change	Deviation From Yearly Change
1962							
1963							
1964							
1965							
1966							
1967							
1968							
1969	573.0	451.0	199.2	1223.2		27.9	
1970	585.8	463.7	210.8	60.3	35.1		7.2
1971	594.3	474.1	226.3	1294.7	36.4		8.5
1972	596.4	474.9	236.4	1307.7	13.0		-14.9
1973	594.4	480.1	260.3	1334.8	27.1		- 0.8

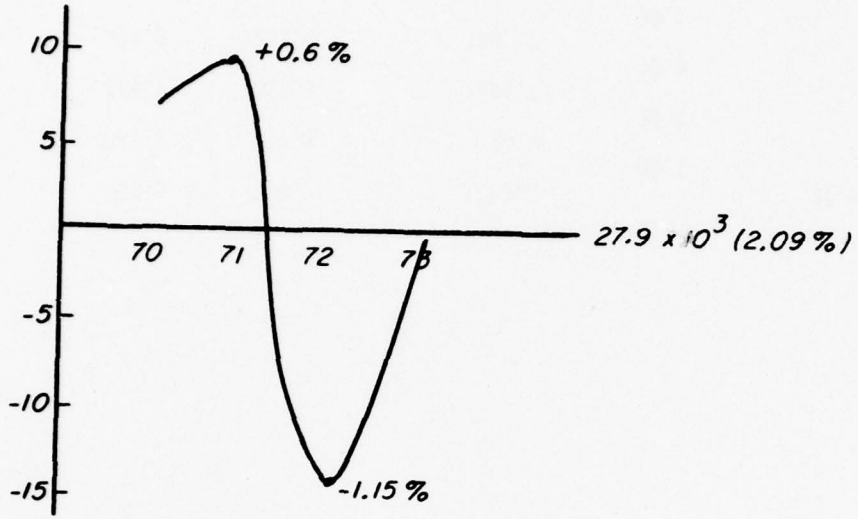

Figure 18. Deviation in average yearly growth rate in population, Fort Monmouth, NJ.

Table 14

Wholesale and Retail Trade Trends (10^6), Fort Monmouth, NJ

Year	Middlesex County	Monmouth County	Ocean County	Total	Adjusted to 1967 Dollars	Change (10^6)	Average Yearly Change	Deviation From Yearly Change
1962								
1963								
1964								
1965								
1966								
1967								
1968								
1969	256	161	71	488	444.5		35.7	
1970	297	179	81	557	479	34.5		-1.2
1971	333	200	92	625	515	36.0		.3
1972	329	219	101	649	518.0	3.0		7.8
1973	427	239	115	781	587.3	69.3		-6.9
						142.8		

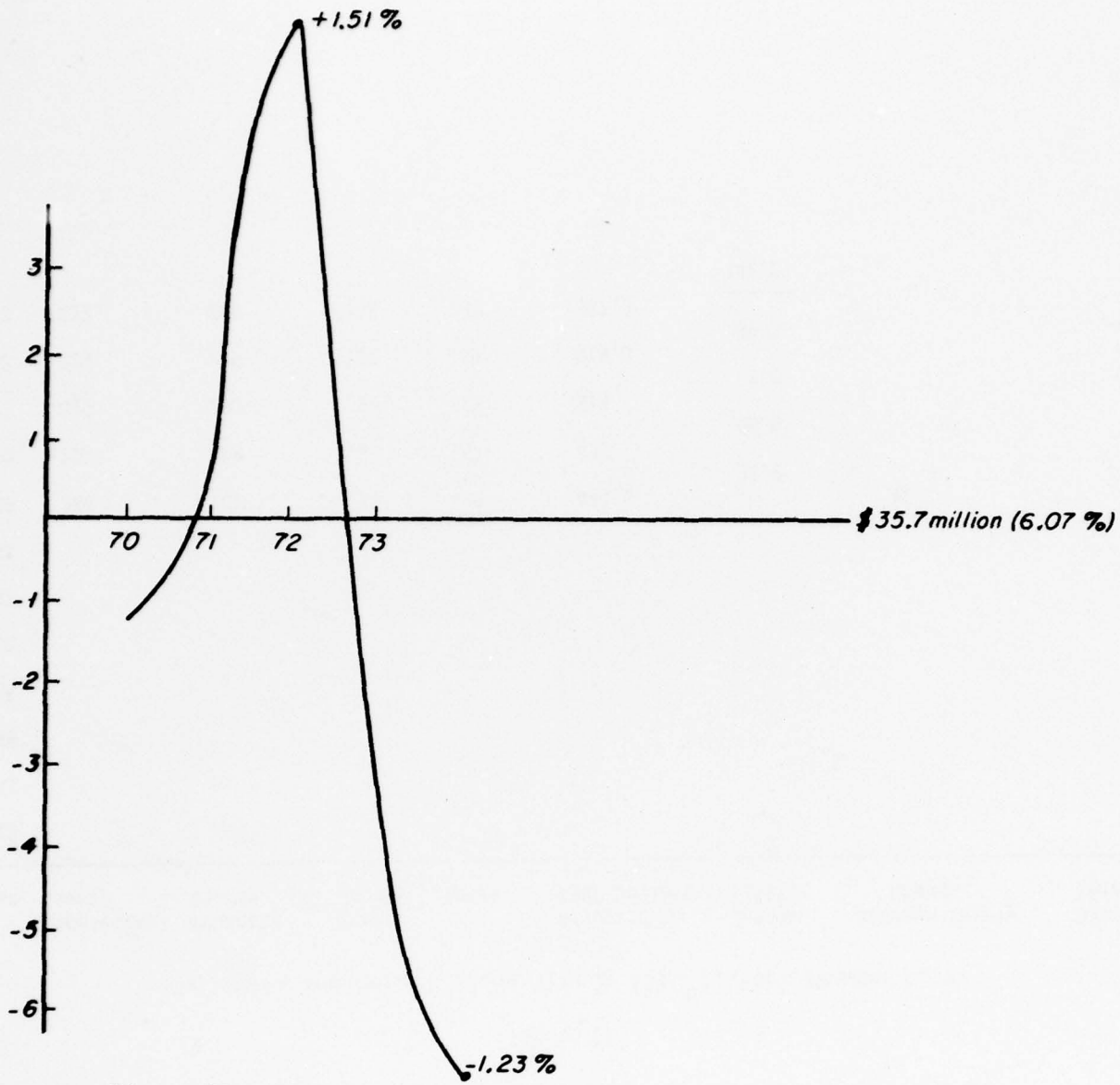

Figure 19. Deviation in average yearly growth rate in wholesale and retail trade, Fort Monmouth, NJ.

Table 15

Personal Income Trends (10^6), Fort Wolters, TX

Year / County	Collin	Dalles	Denton	Ellis	Eastland	Erath	Hood	Johnson	Kaufman	Palo Pinto	Parker	Rockwell	Stephens	Tarrent	Wise	Young	Personal Income Total	Adjusted to 1967 dollars	Change (10^6)	Average Yearly Change	Deviation From Yearly Change
1965	129	2799	135.6	93	35.2	33.9	14.2	89.1	57.5	51	62.6	16.4	19.3	1651	39.7	36.8	5263.3	5568.5		462	
1966	147.6	3466	154.4	102.4	38.9	39.3	16	100.5	62.4	60	78.3	18	20.8	1858	44.3	39.5	6246.4	6427.5	859		397
1967	167.0	3832	174.2	111.1	41.8	41.2	17.6	113.1	69.7	66.8	91.3	19.7	22.3	2120	48.3	42.1	6984.2	6984.2	557		95
1968	193.8	4268	206.2	124.8	46	45.2	22.1	128.9	78.6	79.1	109.2	21.9	23.9	2406	54.7	46	7852.4	7538.3	554		92
1969	229.8	4819	240.2	137.9	49.1	51	22.3	144.5	88.2	90.7	123.2	25.1	26.3	2686	59.3	47.5	8840.1	8053.3	515		53
1970	258	5488	266.9	154.7	54.6	55.1	24.7	162.3	96.5	89.2	124.2	26.7	28.9	2909	65.1	49.7	9853.6	8474.0	421		-41
1971	270.8	5943	291.8	159	56.6	59.3	27.4	173.8	103.5	91.7	123	29.3	29.9	2977	71.2	50.2	10457.5	8616.9	143		-319
1972	303.6	6216	331.0	174	64.3	62.5	33.2	193.2	115	82.7	120.2	34.5	33.7	3247	76.1	60.8	11147.8	8917.1	300		-162
1973	350.2	6867	378.4	199	73.2	70.4	38.4	218	131	87.2	130	38.5	36.7	3542	85.1	74.9	12320	9264	347		-115

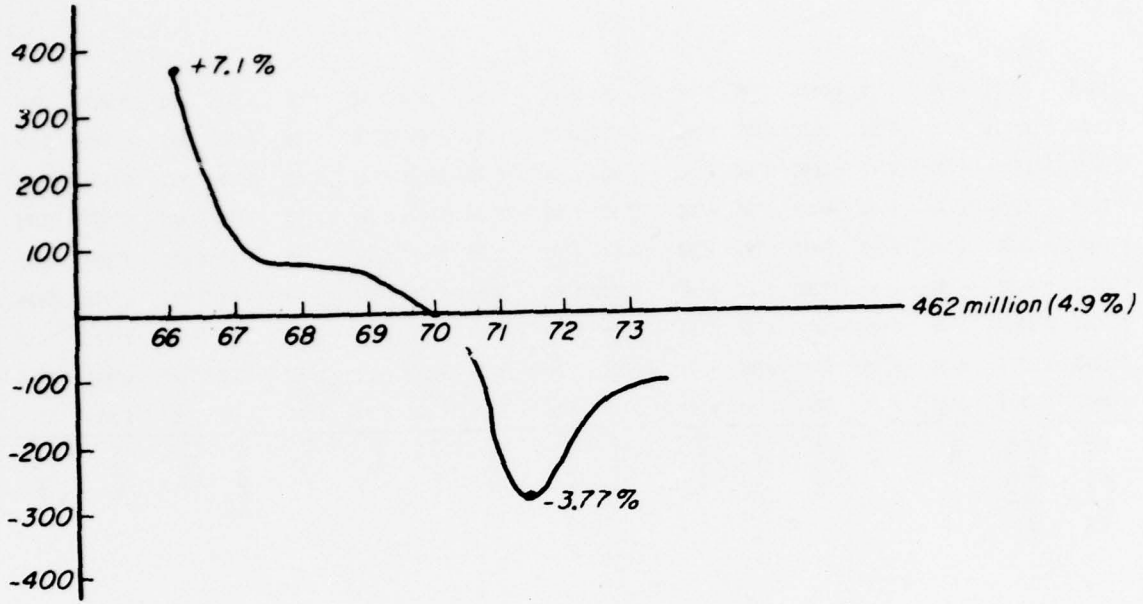

Figure 20. Deviation in average yearly growth rate in personal income (adjusted to 1967 dollars), Fort Wolters, TX.

Table 16

Population Trends (10^6), Fort Wolters, TX

Year	County Collin	Dalles	Denton	Ellis	Eastland	Erath	Hood	Johnson	Kaufman	Palo Pinto	Parker	Rockwell	Stephens	Tarrent	Wise	Young	Total Population	Change ($\times 10^3$)	Average Yearly Change	Deviation From Yearly Change
1965	51.1	1121	57.5	43.7	17.9	17.3	5.1	40.4	29.9	20.2	24.2	6.6	8	590	17.5	14.8	2065		60.12	
																		43		-17.12
1966	54	1144	63.1	44.7	17.4	15.5	5.1	40.2	31.2	20.3	25.5	6.2	7.8	601	17.7	14.6	2108			
																		75		14.88
1967	56.6	1183	68.4	45	17.6	15.8	5.3	41.6	31.7	21	26.7	6.0	8	624	18.6	14.9	2183			
																		83		22.88
1968	60.5	1229	70.5	46.3	17	16.2	5.2	44	32.5	21.7	28.2	6.5	7.6	648	18.6	14.4	2266			
																		107		46.88
1969	63.9	1282	73.3	46.6	17.6	17.2	5.8	45.1	32.6	25.4	31.2	6.8	8	684	19.2	14.9	2373			
																		102		41.88
1970	67.2	1332	75.9	46.8	18.2	18.2	6.4	45.9	32.5	29.1	34.0	7.1	8.4	718	19.8	15.5	2475			
																		33		-27.12
1971	68.7	1346	78.9	47.1	18.6	18.1	7.3	47.9	33.3	27.7	33.2	7.3	8.6	722	19.9	15.8	2508			
																		-6		-66.12
1972	72.8	1345	84.8	48.6	18.7	18.4	7.8	49.7	34.6	24.3	31.6	7.5	8.6	714	20.2	15.6	2502			
																		44		-16.12
1973	81.3	1362	93.2	49.8	18.3	18.8	8.5	52.4	35.7	22.8	32.1	8.3	8.2	719	20.7	15.5	2546			

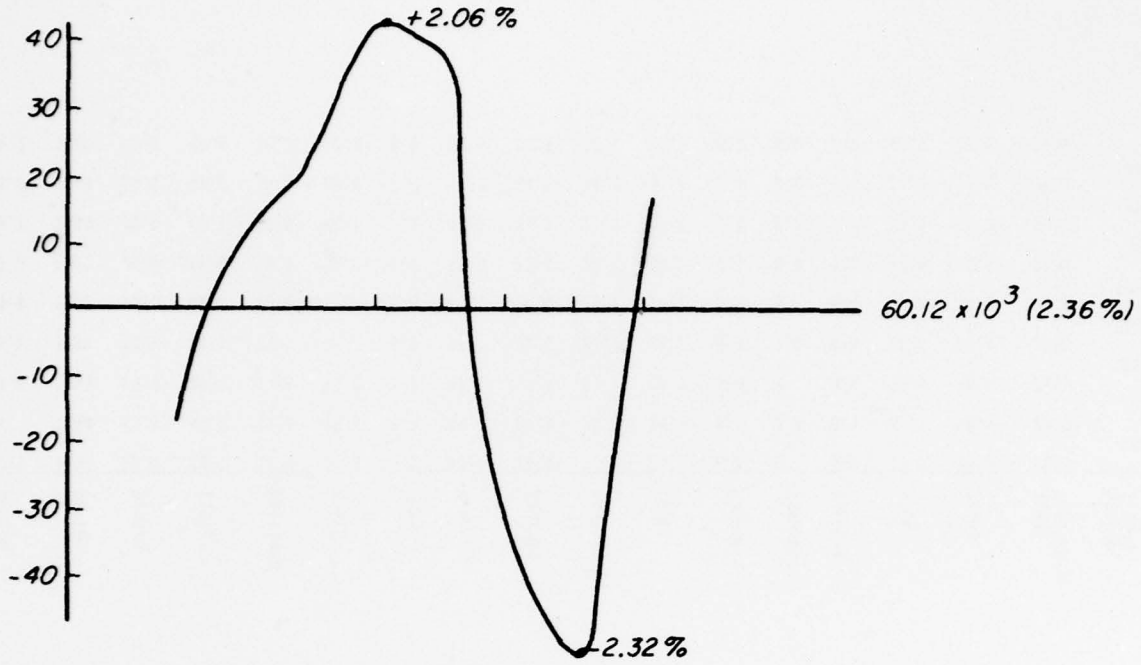

Figure 21. Deviation in average yearly growth rate in population, Fort Wolters, TX.

Using this technique to gauge economic elasticity or resilience, threshold values can be derived which represent the maximum percentages of fluctuation which have occurred historically. This would represent fluctuations which a particular community has endured and would provide a basis for comparing an action's impact to that fluctuation. Therefore, the arbitrary assignment of the same absolute thresholds to varying regions is avoided. No predetermined courses of action can be taken until each region's economy has been evaluated. A systematic approach to this evaluation enables a more defensible conclusion.

Definition of Acceptable Limits of Fluctuation

As shown in Figures 6 through 21, communities or regions exhibit a large degree of fluctuation in the indicator variables selected. In establishing a band of fluctuation around the "average growth rate" variable, and using that band to screen probable impacts, it seems that some degree of conservatism is needed. The band could be made smaller by selecting some arbitrary percentage of the maximum fluctuation--for example, 50 percent. This methodology, although arbitrary, is very similar to the traditional engineering concept that potential threat to human life is often the basis for choosing a factor of safety for bridges, dams, etc. A similar weighting system can be devised for the RTV concept, based on the potential impact of a project on individuals.

In relation to one another, the severity of potential impact increases in the following order: Total business volume, total personal income, total employment, and total population. Business volume impacts can be absorbed by manipulation of other factors, such as inventory, new equipment, etc. Impacts on individual workers or proprietors are neither assured nor immediate. Changes in employment and income, however, are immediate problems, with individuals either being impacted through less work per pay period, or no work at all. This impact usually is accompanied by a corresponding fluctuation in personal income, which also directly impacts individuals. Population, as an indicator of potentially controversial impacts in other areas, is extremely important and should be strenuously weighted to reflect this importance.

Keeping these relative weightings in mind, the scheme shown in Table 17 was developed.

Table 17

Allowable RTV in Percentages of Maximum Historical Deviation in Average Yearly Growth Rate

	Increase*	Decrease*
Change in Total Business Volume	100%	75%
Change in Personal Income	100%	67%
Change in Total Employment	100%	67%
Change in Population	100%	50%

*These percentages represent deviations from average yearly growth rate. The average yearly growth rate is obtained from analysis of data for the past 10 years. In cases where data are not available for the past 10 years, a minimum of 5 years is needed.

These percentage allowances are arbitrary but sensible. The maximum positive historical fluctuation is allowed without reduction because of the positive connotations of economic growth. Although cases of damaging economic growth have been cited, and the "zero-growth" concept is being accepted by many local planning groups, the effects of reductions and closures are much more controversial. Figure 22 shows the effect of these weightings on the general concept.

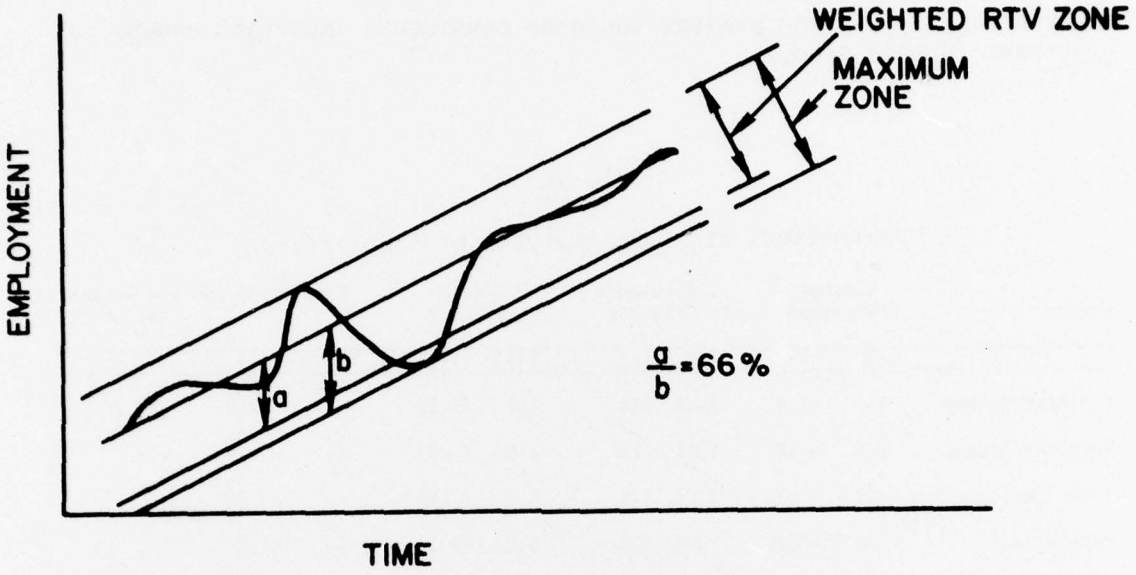

Figure 22. The weighted RTV concept.

Cumulative RTV Weighting

The singular evaluation of RTV parameters, although beneficial to the decision-making process, requires one additional evaluation factor. NEPA's emphasis on the consideration of cumulative impacts seems to support a similar consideration of the RTV factors. Although the absolute thresholds of the four principal factors (business volume, income, employment, and population) may not be surpassed, the effect of cumulative proximity to the thresholds may indicate a problem.

To account for this phenomenon, a weighting scheme is recommended to insure that in all factors cumulatively, the threshold is not being approached. As shown for a hypothetical case in Table 18, the "borderline" case can be reevaluated by using this technique. Taking each factor separately, significance is not implied in the table; however, encroachment on the threshold is obvious. The technique builds an additional safeguard into the RTV analysis. If the cumulative ratio of impact to threshold exceeds 3, significance is implied. For example,

this case would represent a cumulative significance of

$$\frac{-1.15}{-1.2} + \frac{-.46}{-.53} + \frac{-.48}{-.50} + \frac{-1.0}{-1.2} = .96 + .87 + .96 + .83 = 3.62$$

Since 3.62 > 3.0, the project would be considered important enough to warrant further study.

Table 18

A Hypothetical Regional Analysis of Significance

Factor	%Change Historical		Allowance Criteria		2 Change Thresholds		Predicted*		Significance? Yes	No
	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)		
Business Volume	3.2	-1.6	100%	75%	3.2	-1.20	--	-1.15		
Personal Income	2.6	- .8	100%	67%	2.6	- .53	--	- .46		
Total Employment	4.2	- .75	100%	67%	4.2	- .50	--	- .48		
Population	5.0	-2.4	100%	50%	5.0	-1.2	--	-1.0		

*These percentages represent deviations from average yearly growth rate. The average yearly growth rate is obtained by analyzing data for the past 10 years. In cases where data are not available for the past 10 years, a minimum of data for 5 years is needed.

4 CASE STUDY EVALUATION OF PERCENTAGE REDUCTION AND THE RTV TECHNIQUE

CERL is developing an economic impact prediction methodology[5,6,7] (EIFS) for use by DOD elements in complying with NEPA. Although this technique is still under development, it represents a method of quickly obtaining a great deal of background economic information; the estimated resultant magnitudes of change provided by this technique are reasonable; however, it is well recognized that the technique tends to slightly overstate impacts. (An overstatement merely acts as a safety factor by insuring that identified "worst case" impacts are considered early in the Environmental Impact Analysis/Statement.) As development continues, the accuracy of predictions should improve. For this study, several regions were evaluated using the current CERL methodology.

EIFS was queried for eight DOD installations and percentage reductions in respective military and civilian personnel. Table 19 lists the selected installations and percentage reductions investigated.

Table 19

Information Used to Calculate Input Data to the EIFS Model

Installation	Existing Manpower* (Military/Civilian)
1. Fort Huachuca	5791/5413
2. Fort Ord	16,278/2455
3. Fort Gordon	16,166/4247
4. Fort Campbell	22,304/4207
5. Fort Polk	11,671/2727
6. Fort Devens	5245/1500
7. Fort Monmouth	1045/6327
8. Fort Lewis	23,000/3000

*Data obtained through phone inquiry.

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5 R. D. Webster, et al., *Development of the Environmental Technical Information System*, Interim Report E-52/ADA009668 (CERL, April 1975).

6 R. D. Webster, et al., *The Economic Impact Forecast System Description and User Instructions*, Technical Report N-2/ADA027139 (CERL, June 1976).

7 R. D. Webster, et al., *Development of the Economic Impact Forecast System (EIFS) - The Multiplier Aspects*, Draft Technical Report (CERL).

Multi-county regions were defined around the selected installations as follows:

- Fort Huachuca, AZ
  - Pima County, AZ
  - Santa Cruz County, AZ
  - Cochise County, AZ
- Fort Ord, CA
  - Monterey County, CA
- Fort Gordon, GA
  - Richmond County, GA
  - Columbia County, GA
  - Jefferson County, GA
  - Aiken County, SC
- Fort Campbell, KY
  - Montgomery County, TN
  - Stewart County, TN
  - Christian County, KY
  - Trigg County, KY
- Fort Polk, LA
  - Verna County, LA
  - Beauregard County, LA
  - Calcasieu County, LA
  - Rapides County, AL
- Fort Devens, MA
  - Middlesex County, MA
  - Worcester County, MA
  - Suffolk County, MA
  - Hillsborough County, NH
- Fort Monmouth, NJ
  - Monmouth County, NJ
  - Ocean County, NJ
- Fort Lewis, WA
  - Pierce County, WA
  - Thurston County, WA

Although the actual technique for regional definition is under study by CERL and other organizations, the regional definitions identified by the DA Comptroller[8] were used for this study.

Percentage reductions were calculated from Table 19 and used as inputs to EIFS. No change in local expenditures for goods and services was included in the analysis. Therefore, the resultant model inquiries represent only personnel changes. Table 20 summarizes the results of the model inquiries and indicates the range at which the thresholds were

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[8] *Economic Multipliers for Army Base Realignment Studies*, DCA-R-33 (Directorate of Cost Analysis, Office of the Comptroller of the Army, July 1976).

theoretically violated. Since the EIFS model prediction of the population variable is not yet implemented, only three variables are shown.

The results of the model inquiry and evaluation indicate that for the regions selected, very few of the results would have been interpreted as significant until employment was sizably reduced at the installations. The wide variability in results indicates the degree of difference between various DOD-dependent communities. The fluctuation patterns of the economy, volume of activity, and size of the original change all have some bearing on the importance of the impact. As shown for Fort Devens, MA, the impact of full closure would not be singled out as a significant impact using this technique. In the case of Fort Monmouth, NJ, however, the thresholds are violated at a very low level of reduction. In the case of Fort Devens, the high values are caused by the large degree of fluctuation and a very large local economy. In the case of Fort Monmouth, the economy is smaller, while the historical levels of fluctuation remain the same.

Although a small number of installations were analyzed, the range shown in Table 20 indicates that in many cases, this technique will allow relatively large shifts in DOD personnel before the RTV criteria are violated; however, this conclusion is valid only for those economies which are either quite large or have high natural fluctuations of economic activity, and cannot be applied to all actions in general. It is fairly clear, however, that a system of this type would not be overly restrictive on DOD actions.

Table 20

Summary Results of Model Inquiries

Element	Base No.	Percentage Reduction Producing Significant Impact*						
	1	2	3	4	5	6	7	8
Business Volume	22	38	59	22	47	293	25	44
Total Personal Income	22	29	39	22	30	197	6	26
Total Employment	12	12	31	20	27	156	8	23

*For example, the upper limit for manpower reductions at Base 3 was 59 percent using business volume as an indicator, 39 percent using total personal income, and 31 percent using total employment. It should be noted that these figures are based on salary and manpower reductions only. No reductions in local procurements were considered.

5 CONCLUSIONS

The rational threshold value technique can be used to determine the significance of economic and related social impacts which might result from Army military activities. The socio-economic elements necessary for developing RTV techniques are changes in business volume, personal income, and employment; impact on local government revenues and expenditures; changes in income and employment distribution; impacts on local housing, regional economic stability, local school systems, and local government bond obligations; changes in population, welfare and dependence, and social control; and aesthetic considerations.

To insure the efficiency of the RTV, the significance and derivation of RTVs were assessed on the basis of three considerations: predictive capability of existing forecasting techniques; availability of data to adequately address the identified problem; and relative cost of effective implementation. Using the elements selected by these assessment methods, several hypothetical case studies were investigated to ascertain the practicality and usefulness of the technique. Results of these studies indicate that the RTV technique can be used as a screening device to establish the significance of economic and related social impacts resulting from Army military activities.